

Remarks

I. Status of claims

Claims 1-37 were pending.

Claim 31 has been canceled without prejudice.

Claims 38 and 39 have been added.

II. Claim rejections under 35 U.S.C. § 101

The Examiner has rejected claims 18-31 and 37 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Independent claim 18 has been amended in a way that addresses the Examiner's § 101 concerns. Claims 19-30 depend from independent claim 18. Independent claim 31 has been canceled. For these reasons, the rejection of claims 18-31 and 37 under 35 U.S.C § 101 now should be withdrawn.

III. Claim rejections under 35 U.S.C § 102

A. Introduction

The Examiner has rejected claims 1-37 under 35 U.S.C. § 102(b) over Kamei (U.S. 6,243,492).

B. Independent claim 1

Independent claim 1 has been amended and now recites:

I. A method of assessing image quality, comprising:

detecting a target object region in an input image, wherein the detecting is performed on image data derived solely from the input image without regard to image data derived from any image other than the input image and the detecting comprises determining that the target object region comprises a target object;

generating an image quality feature vector representing the target object region in an image quality feature space, wherein the

generating comprises generating the image quality feature vector from image data derived solely from the input image without regard to image data derived from any image other than the input image; and

mapping the image quality feature vector to a measure of image quality based on a classification model that correlates image quality feature vectors with respective image quality values; and

outputting a quantitative assessment of quality of the input image based on the measure of image quality.

As explained in detail below, the rejection of independent claim 1 under 35 U.S.C. § 102(b) over Kamei should be withdrawn because Kamei neither expressly nor inherently discloses each and every element of the invention defined by the claim.

Kamei does not disclose “detecting a target object region in an input image, wherein ... the detecting comprises determining that the target object region comprises a target object,” as now recited in claim 1. In accordance with the Examiner’s position, “a sub-region corresponds to a target object region” (see page 5, lines 1-2 of the Office action). A sub-region, however, is not “detected” in an input image. Instead, each sub-region corresponds to one of a uniform set of a predefined number of non-overlapping rectangular regions into which the input image is divided (see col. 11, lines 52-60). In addition, Kamei does not disclose that detecting a sub-region comprises “determining that the target object region comprises a target object.” Instead, each sub-region is determined by dividing the input image into a set of uniform rectangular sub-divisions without any regard whatsoever to the contents of those sub-divisions (see col. 11, lines 52-60).

Kamei also does not disclose “generating an image quality feature vector representing the target object region in an image quality feature space,” as recited in claim 1. In accordance with the Examiner’s position, the quality vector defined in equation (26) in col. 13 constitutes an image quality feature vector. The quality vector Q defined in equation (26) consists of quality index values Q_i , each of which represents the quality index value of a respective one of L principal component vectors Ψ_i across the entire image (i.e., all sub-regions C) (see, e.g., col. 13, lines 43-52, and equation (25) in particular). Thus, neither the image quality vector Q nor its constituent quality index values Q_i represents any of the individual sub-regions C .

Kamei also does not disclose "mapping the image quality feature vector to a measure of image quality based on a classification model that correlates image quality feature vectors with respective image quality values," as now recited in claim 1. In accordance with the Examiner's position, the calculating of the standard deviation values σ_i as described in col. 14 of Kamei constitutes mapping the quality vector Q to a measure of image quality. Each of the standard deviation values σ_i , however, measures the confidence of an associated condensed feature vector v_i (see col. 14, lines 1-6 and 30-37). The standard deviation values, taken alone or in combination, do not reveal any information whatsoever about image quality.

Kamei also does not disclose "outputting a quantitative assessment of quality of the input image based on the measure of image quality," as now recited in claim 1. Instead, Kamei uses the condensed feature vector v and the associated confidence vector σ in a process that matches the input image to feature vectors and confidence vectors that were extracted from other images (see, e.g., col. 14, line 64 - col. 15, line 24).

For at least the reasons explained above, the rejection of independent claim 1 under 35 U.S.C. § 102(b) over Kamei now should be withdrawn.

C. Claims 2-17

Each of claims 2-17 incorporates the elements of independent claim 1 and therefore is patentable over Kamei for at least the same reasons explained above.

D. Independent claim 18

Independent claim 18 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore independent claim 18 is patentable over Kamei for at least the same reasons explained above in connection with independent claim 1.

E. Claims 20-30 and 37

Each of claims 20-30 and 37 incorporates the elements of independent claim 18 and therefore is patentable over Kamei for at least the same reasons explained above.

F. Independent claim 31

Independent claim 31 has been canceled.

G. Independent claim 32

Independent claim 32 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore independent claim 32 is patentable over Lubin for at least the same reasons explained above in connection with independent claim 1.

H. Independent claim 33

Independent claim 33 has been amended and now recites:

33. A method of generating an image quality assessment engine, comprising:
- for each of multiple input images
 - detecting a respective target object region in a respective one of the input images based on image data derived solely from the respective input image without regard to image data derived from any image other than the respective input image, wherein the detecting comprises determining that the target object region comprises a target object, and
 - generating a respective image quality feature vector representing the respective target object region in an image quality feature space, wherein the generating comprises generating the respective image quality feature vector from image data derived solely from the respective input image without regard to image data derived from any image other than the respective input image;
 - correlating the image quality feature vectors with respective measures of image quality assigned to the input images;
 - determining a mapping between image quality feature vectors and the assigned measures of image quality; and

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storing the mapping as computer-readable instructions on a computer-readable medium.

For the reasons explained above in connection with independent claim 1, Kamei does not disclose any of the "detecting" and "generating" elements of independent claim 33.

Kamei also does not disclose "correlating the image quality feature vectors with respective measures of image quality assigned to the input images," as recited in claim 33. In the Office action, the Examiner based his rejection of independent claim 33 solely on the same rationale given in support of the rejection of independent claim 1 (see page 9, line 9 of the Office action). This rationale, however, does not address the claim language "correlating the image quality feature vectors with respective measures of image quality assigned to the input images," as recited in claim 33. Therefore, the Examiner has not shown that Kamei discloses the "correlating" element of independent claim 33.

For at least the reasons explained above, the rejection of independent claim 33 under 35 U.S.C. § 102(b) over Kamei now should be withdrawn.

I. Claims 34-36

Each of claims 34-36 incorporates the elements of independent claim 33 and therefore is patentable over Lubin for at least the same reasons explained above.

IV. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

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